**MATH 1C Course Outline as of Fall 2013**

# CATALOG INFORMATION

Dept and Nbr: MATH 1C Title: CALCULUS 3
Full Title: Calculus, Third Course
Last Reviewed: 9/14/2020

| Units | | Course Hours per Week | | Nbr of Weeks | Course Hours Total | |
|---|---|---|---|---|---|---|
| Maximum | 4.00 | Lecture Scheduled | 4.00 | 17.5 | Lecture Scheduled | 70.00 |
| Minimum | 4.00 | Lab Scheduled | 0 | 17.5 | Lab Scheduled | 0 |
| | | Contact DHR | 0 | | Contact DHR | 0 |
| | | Contact Total | 4.00 | | Contact Total | 70.00 |
| | | Non-contact DHR | 0 | | Non-contact DHR | 0 |

Total Out of Class Hours: 140.00 Total Student Learning Hours: 210.00

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|---|---|
| Title 5 Category: | AA Degree Applicable |
| Grading: | Grade Only |
| Repeatability: | 00 - Two Repeats if Grade was D, F, NC, or NP |
| Also Listed As: | |
| Formerly: | |

**Catalog Description:**
Multivariable calculus including partial differentiation and multiple integration, vector analysis including vector fields, line integrals, surface integrals, and the theorems of Green, Gauss and Stokes. (Formerly taught as MATH 2A)

**Prerequisites/Corequisites:**
Course Completion of MATH 1B

**Recommended Preparation:**

**Limits on Enrollment:**

**Schedule of Classes Information:**
Description: Multivariable calculus including partial differentiation and multiple integration, vector analysis including vector fields, line integrals, surface integrals, and the theorems of Green, Gauss and Stokes. (Formerly taught as MATH 2A) (Grade Only)
Prerequisites/Corequisites: Course Completion of MATH 1B
Recommended:
Limits on Enrollment:

Transfer Credit: CSU;UC.
Repeatability: Two Repeats if Grade was D, F, NC, or NP

## ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

| | | | | |
|---|---|---|---|---|
| **AS Degree:** | **Area** | | Effective: | Inactive: |
| | B | Communication and Analytical Thinking | Fall 2010 | |
| | MC | Math Competency | | |
| **CSU GE:** | **Transfer Area** | | Effective: | Inactive: |
| **IGETC:** | **Transfer Area** | | Effective: | Inactive: |

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|---|---|---|---|---|---|
| **CSU Transfer:** | Transferable | Effective: | Fall 2010 | Inactive: | |
| **UC Transfer:** | Transferable | Effective: | Fall 2010 | Inactive: | |

**CID:**
CID Descriptor: MATH 230 Multivariable Calculus
SRJC Equivalent Course(s): MATH1B AND MATH1C

**Certificate/Major Applicable:**
Major Applicable Course

## COURSE CONTENT

**Outcomes and Objectives:**
Upon completion of the course, students will be able to:
1. Compute partial derivatives, directional derivatives and gradients, tangent planes and extrema of functions of two variables.
2. Apply chain rules to multivariable and vector functions.
3. Compute and apply area in the plane, double integrals and volume, center of mass, and moments of inertia.
4. Compute and apply surface area, triple integrals and volume, double integrals in rectangular and polar coordinate systems, and triple integrals in rectangular, cylindrical, and spherical coordinate systems.
5. Apply change of variables to evaluate integrals.
6. Apply vector fields, line integrals, independence of path, surface integrals, and the theorems of Green, Gauss, & Stokes.
7. Use a computer algebra system (CAS) to evaluate partial derivatives and multiple integrals in various coordinate systems, including rectangular, cylindrical and spherical.
8. Use a computer algebra system to solve problems involving optimization, moments, area, and volume.
9. Use computer graphing technology to visualize three dimensional curves, surfaces and vector fields.
10. Identify career objectives related to mathematics.

**Topics and Scope:**

I. Functions of Several Variables
   A. Surfaces in space
   B. Partial derivatives

C. Chain rules
D. Directional derivatives and gradients
E. Tangent planes
F. Extrema of functions of two variables

II. Multiple Integration
A. Area in the plane
B. Double integrals and volume
C. Center of mass and moments of inertia
D. Surface area
E. Triple integrals and volume
F. Triple integrals in cylindrical and spherical coordinate systems
G. Change of variables

III. Vector Analysis
A. Vector fields
B. Line integrals
C. Independence of path
D. Surface integrals
E. Theorems of Green, Gauss & Stokes

IV. Technology
A. Computer algebra systems
1. Partial derivatives and multiple integrals
2. Volume and area
B. Visualization of three dimensional graphs
1. Rectangular, cylindrical, spherical coordinate systems
2. Curves, surfaces, contour maps
3. Vector fields

**Assignment:**

1. Daily reading outside of class (20-50 pages per week).
2. Problem set assignments from required text(s) or supplementary materials chosen by the instructor (1-6 per week).
3. Quizzes (0-4 per week).
4. Exams (3-8 per term).
5. Projects (for example, computer explorations or modeling activities, 0-10 per term).

**Methods of Evaluation/Basis of Grade:**

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

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| None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments are more appropriate for this course. | Writing<br>0 - 0% |

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

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| Homework problems | Problem solving<br>5 - 20% |

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

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| None | Skill Demonstrations<br>0 - 0% |

**Exams:** All forms of formal testing, other than skill performance exams.

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| Multiple choice and free response exams; quizzes | Exams<br>70 - 95% |

**Other:** Includes any assessment tools that do not logically fit into the above categories.

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| Projects | Other Category<br>0 - 10% |

**Representative Textbooks and Materials:**
Calculus: Early Transcendentals (7th). Stewart, James. Thomson Brooks/Cole: 2012.
Thomas' Calculus, Early Transcendentals (12th). Thomas, Weir, and Haas Addison Wesley, 2009.